

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the amendments set forth above and the below remarks.

Applicant files this response to accompany a second RCE application.

Applicant filed on November 8, 2005 a response to a final Office Action mailed on August 11, 2005 and received an Advisory Action mailed on December 5, 2005. In the Advisory Action the Examiner states that "it is noted that the features upon which applicant relies (i.e., track-based incremental backup) are not recited in the rejected claim(s)." Applicant does not understand this assertion. Claim 1, which is rejected, is set forth below with track-based incremental backup features emphasized in bold:

A method for **incrementally backing up data** from a logically represented volume on disk media, accessible by a client through a network connection, the client comprising an enterprise database application, said method comprising:
identifying **tracks** of the logically represented volume that have changed since a last **incremental backup** operation by reading fresh data indications, (i) wherein each of the fresh data indications corresponds to a **track** of the logically represented volume and (ii) wherein a given fresh data indication is indicative of whether its corresponding **track** has been changed since a last **incremental backup** operation;
identifying files for **incremental backup**, the identified files comprising changed and unchanged blocks saved on a **track** deemed changed since a last **incremental backup** operation; and
incrementally backing up the identified files from the disk media to sequential storage media through a high speed connection.

Applicant respectfully requests clarification for the Examiner's contention that these features are not recited in the rejected claims.

The Prior Art Rejections

The Examiner rejects claims 1-13 under 35 U.S.C. §103 over U.S. Patent No. 5,720,026 to Uemura et al in view of Levy et al, *Incremental Recovery in Main Memory Database Systems*, and U.S. Patent No. 6,038,665 to Bolt et al.

In the Advisory Action the Examiner further states that “Bolt et al. teaches recognition of unchanged blocks of data that were backed-up” point to col. 9, lines 26-41. Applicant respectfully submits that this reading of Bolt is not correct. Bolt teaches in Figure 3 and in the cited passage that blocks that have changed, as determined from digital signatures, are placed in a “chunk file.” Blocks in the chunk file are ultimately transmitted to a specified destination. However, unchanged blocks are *not* backed up. At col. 8, lines 40-47, Bolt states (emphasis added):

Returning to the negative loop originating at decision diamond 56, when the *digital signature* of the block_i *does not match* one of the signatures stored in the listing for the block, ***a change to the block_i is indicated***, and the block_i therefore becomes a ***candidate for back up***.

Applicant submits that Bolt does not teach identifying unchanged blocks for backup, but rather teaches using digital signatures to identify *changed* blocks for backup.

With regard to Uemura, this reference merely teaches incremental backup of *changed blocks* of data in a storage unit. Claim 1 requires identifying *files* for incremental backup having *changed and unchanged* blocks, the files being identified from tracks that have changed since the last incremental backup. In contrast, Uemura is limited to backup of changed blocks.

As for Levy, Applicant respectfully submits that this reference, which is directed to quick restart after a crash, is simply not relevant to the claimed invention for at least the reasons of record.

The rejections are discussed further below.

The claimed invention is directed to a track-based incremental backup technique. The Examiner relies upon Uemura, Levy, and now Bolt in attempt to arrive at the claimed invention. However, none of Uemura, Levy, or Bolt even contain the word or concept of the claim term “track.” In view of this, and at least the further reasons set forth below, Applicant submits that the Examiner’s rejection are not supportable and should be withdrawn.

Claim 1 requires a method for incrementally backing up data including identifying tracks of a logically represented volume that have changed since a last incremental backup operation and *identifying files for incremental backup* comprising blocks saved on a **track** deemed changed since a last incremental backup operation. As described in the specification in paragraph [0036], with this arrangement identified files can include *blocks on a track deemed changed*, as well as *blocks that were not deemed changed* since the last incremental backup. That is, *files* are backed up, not just blocks. Files, tracks and blocks are discussed at in Applicant's specification at paragraphs [0031-33], for example, accompanying Figure 4.

In contrast, Uemura, which takes a 'database' view, discloses an incremental backup system having a storage unit that is accessed in block units for storing data to be backed up. As noted by the Examiner, the system includes a "difference management mechanism for managing difference data in disk blocks." (col. 4, lines 44-45). As shown in Figure 6 of Uemura, for each *block* the generation in which it is backed up is noted. Uemura simply does not contemplate *identifying files* for incremental backup as required by claim 1.

It should be noted that Figure 7 of Uemura shows overlap since two days of difference block data is backed up to "cope with an unexpected fault on the tape unit." This is completely different than the claimed track-based incremental file backup, which can include *changed* and *unchanged* blocks.

As for Levy, Applicant submits that this reference is not relevant to the claimed invention and does not overcome any of the deficiencies of Uemura described above. Levy, in the portions pointed to by the Examiner, is directed to fast restart after a crash to resume *transaction processing* as soon as possible while "preserving the **consistency of the database**." (emphasis added). This is in contrast to the method of claim 1 which is directed to *incremental backup* and *identifying files for incremental backup deemed changed since the last incremental backup*. Levy is directed to transaction processing and redo logs for databases.

The Examiner alleges that Bolt “teaches identifying blocks of data for backup which include unchanged blocks” at col. 9, lines 22-40 (set forth below) and Figure 3, step 76.

“If, however, the digital signature MD5 of the block having as its first byte the byte.sub.k under test is determined to be equal to one of the digital signatures MD5.sup.old in the ordered list at decision diamond 75, the logic returns “resynchronized” and moves to block 76. In other words, a positive test at decision diamond 75 indicates that the logic has found an old, unchanged block that previously has been backed up, and, hence, that the logic is resynchronized with the comparison value listing.

At block 76, the changed block(s) (also referred to herein as “transmission blocks”) are moved to a “next chunk” file. Additionally, at block 76 the comparison value listing is updated to include the first two characters and digital signatures of the changed block(s), for use as the first and second comparison values, respectively, during the test of the blocks during the next back up cycle. Moving to decision diamond 78, it is determined whether the chunk file is full. In the presently preferred embodiment, the chunk file is full when its size is five megabytes (5 MB).”

As noted above, Applicant does not claim incremental backups in general, but rather, a track-based incremental backup technique. Bolt merely discloses an incremental back up system relying upon digital signatures to detect changes in blocks. Bolt, like, Uemura and Levy, does not teach or suggest a track-based incremental backup.

Moreover, Applicant respectfully request clarification as to the teaching for which Bolt is relied upon. Claim 1 requires “identifying tracks...that have changed since a last incremental backup, ...identifying files for incremental backup, the identified *files* comprising ***changed and unchanged blocks*** saved on track deemed changed....and incrementally backing up the identified *files*.” The passage pointed to by the Examiner merely teaches that unchanged blocks, as determined by the MD5 code, *are not backed up*. The cited passage teaches that changed blocks are moved to a ‘next chunk’ file.

In view of the above, Applicant submits that claim 1 is patentably distinguishable over Uemura, Levy, and/or Bolt, taken alone or in combination with each other. For substantially the same reasons, Applicant submits that claims 2-13 are also distinguishable.

The Examiner is respectfully invited to telephone the undersigning attorney if there are any questions regarding this Amendment or this application.


Applicant does not acquiesce to any assertion made by the Examiner that is not specifically addressed herein.

The Assistant Commissioner is hereby authorized to charge payment of any additional fees associated with this communication or credit any overpayment to Deposit Account No. 500845.

Dated: 2 Feb 06

Respectfully submitted,

DALY, CROWLEY, MOFFORD & DURKEE, LLP

By: 

Paul D. Durkee

Reg. No. 41,003

Attorney for Applicant(s)

354A Turnpike Street, Suite 301A

Canton, MA 02021-2714

Tel.: (781) 401-9988, ext. 21

Fax: (781) 401-9966

pdd@dc-m.com